^{8}Be nuclear data evaluation

Philip R. Page, Gerald M. Hale

Los Alamos National Laboratory

An R-matrix analysis of experimental nuclear data on the reactions ^{4}He(α,α), ^{4}He(α,p), ^{7}Li(p,α), ^{7}Li(p,p), ^{7}Li(p,n), ^{7}Be(n,p), ^{6}Li(d,α), ^{6}Li(d,p) and ^{6}Li(d,n) leading to the ^{8}Be intermediate state has been completed over the last two years. The excitation energy above the ^{8}Be ground state has been brought up to at least 22–24 MeV for all reactions except ^{4}He(α,α) and ^{7}Be(n,p). More than 4000 data points are included. The data for the reaction ^{4}He(α,α) do not fit well, but the other six reactions fit with a reasonable χ^2/(point). Most of the resonances found in the R-matrix analysis correspond to resonances formerly known from experiment. There are at least 18 resonances in this analysis. Integrated ^{4}He(α,p), ^{7}Li(p,α), ^{7}Li(p,n), ^{6}Li(d,α), ^{6}Li(d,p) and ^{6}Li(d,n) cross sections are presented and compared with nuclear data.

Email: prp@deuteron.lanl.gov